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\*Corresponding author: Thomas Viskum Gjelstrup Bredahl, Department of Sports Science and Clinical Biomechanics, University of Southern Denmark, Campusvej 55, Odense M 5230, Denmark  
E-mail: [tbredahl@health.sdu.dk](mailto:tbredahl@health.sdu.dk)

Reviewing editor:  
Niall MacFarlane, University of Glasgow, United Kingdom

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## SPORTS & EXERCISE | RESEARCH ARTICLE

# Adherence to physical activity in a workplace setting – A qualitative interview study

Thomas Viskum Gjelstrup Bredahl<sup>1\*</sup>, Rasmus Soelbjerg Christensen<sup>1</sup>, Just Bendix Justesen<sup>1</sup> and Jeanette Refstrup Christensen<sup>1</sup>

**Abstract: Purpose:** Employees at a Danish production company experienced little adherence to company-initiated workplace physical activity (WPA). The objective of this study was to analyse factors explaining non-adherence to WPA from the Theory of Planned Behaviour (TPB) and Trans Theoretical Model (TTM). The TPB explains the criteria for intent towards certain behaviour and the TTM explains behaviour from stages of change and cognitive and motivational considerations.

**Method:** The study was done at a Danish production company that manufactures plastic bags. Data was collected using individual semi-structured interviews with 6 male employees with a mean age of 46 years (range 32–64). Respondents were recruited using purposive sampling, aimed at non-adhering employees. The interview guide was constructed based on the TPB and TTM. The interviews lasted between 30 and 50 minutes. Thematic analysis was done by analyst triangulation.

**Results:** The majority of respondents had a low sense of control over factors influencing their intent such as time of day, distance to activity, work planning and low level of perceived behavioural control and half the respondents reported that they felt able to overcome these factors but lacked an incentive. Disadvantages, such as perceived low level of physical ability, clearly outweighed advantages: processes of change were dominated by cognitive processes and only one

### ABOUT THE AUTHORS

Thomas Viskum Gjelstrup Bredahl Our research group focuses on different domains of workplace physical activity. The domain is addressed from different perspectives such as health, “Intelligent exercise” - where the exercise is designed specifically to individual needs of the employee to productivity, presenteeism, return of investment, middle managers and barriers and facilitators for participating in workplace physical activity. The current manuscript is part of the struggle to optimise the potential of workplace physical activity to enhance overall public health.

### PUBLIC INTEREST STATEMENT

Physical activity at the workplace is a good way to enhance population health. Many physical activity interventions (PAI) are offered at workplaces but the adherence is low. It is therefore relevant to understand which factors can explain what makes employees engage in physical activity at work. To offer motivating and efficient workplace PAI this study analyses health psychological facilitators and barriers for participation in a Danish workplace PAI. The information was collected from interviews with male machine operators. The results show that barriers towards participation were low control of practical planning (time of day, distance to physical activity and work planning) and a low perception of being able to perform the required physical activity. Future workplace PAI should take these factors into account to ensure that the health of as many employees as possible benefit from being physically active at the workplace.

respondent exhibited an adequate level of self-efficacy needed to take active steps towards changing behaviour.

**Conclusions:** Future WPA interventions should consider participants' control over factors influencing the intervention and be sure that the advantages of participating outweigh the disadvantages.

**Subjects:** Sport and Exercise Science; Exercise Psychology; Behavioral Medicine

**Keywords:** health behaviour; intention-behaviour gap; motivation; exercise; compliance; employee; work

## 1. Introduction

The correlation between obesity and being overweight and a wide range of lifestyle diseases, such as coronary and cerebrovascular diseases, type-2 diabetes and numerous types of cancer, has been well established (Knight, 2011; Varbo et al., 2015). Furthermore, sedentarism has an influence on obesity and being overweight and increased all-cause mortality (Knight, 2011). Dregan, Stewart, and Gulliford (2013) also found a correlation between cardiovascular risk factors and accelerated cognitive decay (Dregan et al., 2013). Choice of lifestyle has an influence on physical and cognitive functionality and accordingly has a potential effect on a wide range of aspects, including work-life balance (Christensen, Kongstad, Sjogaard, & Sogaard, 2015). Furthermore, studies show that physical exercise can lower the risk of long-term illness in employees by increasing the physical capacity of their bodies (Christensen et al., 2011, 2015). Promoting the health of employees will therefore potentially benefit the government, the workplace and the individual (Andreasen, Falk, & Nielsen, 2009; Gram et al., 2014). Due to the risk factors above, health interventions targeting employees' physical activity seem a plausible employer tool to help employees with low productivity or high absence from work (Cancelliere, Cassidy, Ammendolia, & Cote, 2011; Christensen et al., 2015). Underlining the fact that the workplace can be an important arena for health promotion, national statistics show that as many as, 2.7 million Danes had a full-time job in the second quarter of 2016 (Denmark's statistical database, 2016). Therefore, the workplace seems an optimal space for workplace physical activity (WPA) and for reaching a large proportion of the population and furthermore, those in need of health promotion.

The goal of ensuring healthy employees throughout their work life and lowering absence from work was the reason a Danish production company offered free bicycle and running workouts at the workplace during working hours.

In spite of the free WPA offered by the Danish production company, the majority of the employees did not take part in the offered WPA. This matches other studies, which also show limited adherence to interventions and WPA (Abraham & Graham-Rowe, 2009; Bredahl, Saervoll, Kirkelund, Sjogaard, & Andersen, 2015; Dalager et al., 2015; Gurlan et al., 2016). Limited adherence is often controlled by numerous individual, organisational, implementational and social constructs and processes (Bredahl et al., 2015; Gram et al., 2014; Ilvig et al., 2018). To ensure better adherence to WPA, and possibly increase employee health, it is relevant to explore reasons for not attending WPA.

However, in companies offering the same opportunities to all employees, individual motivational thoughts and behavioural processes may explain the lack of attendance to some degree.

To gain insight into individual thoughts and behavioural processes, several theories have been formulated focusing on one or more psychological and social constructs. One is the Theory of Planned Behaviour (TPB) (Ajzen, 1991). The TPB consists of attitudes towards behaviour, subjective norms and perceived behavioural control (PBC) and explains the criteria for intent towards certain behaviour. Attitude is defined as a function of the individual belief held about exercise as well as

the evaluation or value of the likely outcomes of exercise. Subjective norms comprise beliefs of others and the extent to which one is motivated to comply with such beliefs and people. Perceived behavioural control is explained as the perceived ease or difficulty of performing a specific behaviour (Biddle & Nigg, 2000). The TPB has been considered too static by some researchers and as having trouble predicting change in itself (Hagger, 2015) and as argued by Courneya (1995), The TPB lacks cognitive and motivational considerations (Courneya, 1995). In spite of this critique, the TPB is useful as a starting point for analysing behavioural change in combination with other theoretical approaches (Hagger, 2015). Since no single theoretical approach fully explains exercise behavior, studies combine (Hagger & Chatzisarantis, 2014) or recommend combining different theoretical approaches (Gourlan et al., 2016; Hagger & Chatzisarantis, 2014). One theoretical approach that could supplement the understanding of behaviour from TPB is the Transtheoretical Model of Stages of Change (TTM) (Norcross, Krebs, & Prochaska, 2011). The TTM incorporates cognitive, behavioural and temporal aspects of changing behaviour (Biddle & Nigg, 2000). The TTM assumes that adapting to a new behaviour occurs through a circular and not a linear process, adding a temporal factor to the stages of readiness (precontemplation—no intention to start exercising regularly; contemplation—intention to start exercising regularly, usually within the next 6 months; preparation—immediate intention (within the next 30 days) and commitment to change; action—engaging in regular exercise but for less than six months; and maintenance—engaging in exercise for more than six months) (Biddle & Nigg, 2000; Prochaska et al., 2005). Individual progression through the stages is determined by three factors: processes of change, decisional balance (pros and cons) and self-efficacy (SE). In processes of change, an individual will typically apply experimental processes, such as obtaining knowledge about physical activity (PA), acknowledging health risks associated with a sedentary lifestyle in the early stages. Secondly, one will, to a larger extent, make use of behavioural processes, finding appropriate kinds of PA, social support etc. (Hall & Rossi, 2008). The decisional balance describes how the individual evaluates of the costs (cons) and benefits (pros) of engaging in exercise behaviour, thus also affecting processes of change (Biddle & Nigg, 2000). Thirdly, Self-Efficacy (SE), the sense of mastery, originally developed by Albert Bandura (1986), has been integrated into the TTM (Bandura, 1986; Biddle & Nigg, 2000). SE is defined as the belief that one has the ability to perform a behaviour and that it will result in the expected outcome. Furthermore, SE explains the individual expectation of the produced outcome of the given behaviour (Biddle & Nigg, 2000). SE is increased by prior behavioural experiences of a positive nature (Biddle & Mutrie, 2007). According to Bandura (1986), besides assessment of the individual's sense of successfully performing a certain task, two additional factors should be considered. The first factor is the magnitude of SE. That is, understanding the extent to which the sense of mastery is applicable to a specific task. The other factor is the generality of SE, the extent to which SE in one area also applies to another (Bandura, 1986; Biddle & Mutrie, 2007; Nigg et al., 2011; Norcross et al., 2011). Thus, considering individual motivation and cognitive aspects, the TTM offers supplementary insights into factors influencing behavioural change.

However, more than any single theory, combining the TPB and TTM could offer a multifaceted and comprehensive perspective, considering underlying constructs and attitudes as well as various levels of readiness. Furthermore, it combines understanding elements of intention (TPB) with elements of action planning (TTM) (Hagger & Chatzisarantis, 2014). Besides supplementing each other, the two theories also exhibit similarities. For one, attitudinal beliefs and the decisional balance both account for factors influencing individual actions. Secondly, PBC and SE are considered to be similar in explaining personal sense of influence on a given situation (Hagger & Chatzisarantis, 2014). Thirdly, the intentional construct in the TPB is considered parallel to the initial TTM stages, both describing predecessors to behaviour (Courneya, 1995).

### **1.1. Purpose**

The purpose of this study, based on the TPB and TTM, is to explore individual factors explaining non-adherence to WPA in a Danish company. The aim is to explore individual cognitive, behavioural and temporal processes and constructs causing non-adherence to WPA by answering the

following research questions: 1) How do TPB constructs explain the respondents' non-adherence to WPA, and 2) How do TTM constructs explain the respondents' non-adherence to WPA?

## 2. Methods

### 2.1. Procedure

Data for this study was collected from a sample of 126 blue-collar workers (both men and women) at a production company that manufactures plastic bags, 24 hours a day in 12-hour shifts, from 5 a.m. until 5 p.m. or vice versa. One year prior to data collection in 2011, the company offered all employees health tests (fitness level, weight, body fat percentage, BMI and Metabolic age) followed by preparation of an individual diet and exercise schedule. 54 employees participated in the baseline test (test 1). 60 percent were categorised with a low or very low fitness level ( $< 35$  ml/kg/min,  $< 28$  ml/kg/min respectively (Holtermann et al., 2010)). The tests were repeated 6 months later (test 2). After test 1, individually designed training schedules were offered. For example, these consisted of weekly cycling, walking and running sessions during working hours and were free of charge to all employees. The cycling, walking and running sessions were done in the local area near the workplace. Training was scheduled to start at 4 p.m. and end at 5 p.m. The employees were offered to do WPA in groups divided by interest and physical level. The WPA consisted of a warm-up and then PA with varied intensities in relation to participants' level of physical competence. The WPA finished with a cool-down and a short period of stretching. The WPA was delivered by an instructor with adequate education and skills. The second author helped the workplace establish and offer the above WPA. Based on purposive sampling with employees taking part in the tests but not in WPA, the aim was to recruit a homogeneous group with a thorough knowledge of the workplace and intervention. From a list given by the head of the HR department, 22 randomly selected employees (both men and women), known to have not participated in WPA, were contacted by phone. Six employees agreed to participate in the study. Those accepting participation were informed of the aim and content of the study, the option to withdraw from the study at any time and all gave their written consent for participation.

At the start of the interviews, respondents were asked to consider their thoughts and feelings as they recalled them after test 1, one year prior to the present study, when WPA was introduced. All interviews were done one-on-one at the factory within working hours, and lasted between 30 and 50 minutes, comprised of open-ended questions, exploring respondents' TPB and TTM constructs. The interview guide (Appendix 1) was grouped into themes so questions aiming to clarify similar constructs from the TPB and TTM were asked in conjunction.

### 2.2. Data analysis

Interviews were recorded digitally and subsequently transcribed verbatim. Transcripts were returned to respondents for comments and validation. All transcripts and content were accepted and no changes were made. A thematic analysis was done based on the steps presented by Braun and Clark (Braun & Clarke, 2006). Practically, thematic analysis involves six steps: familiarising yourself with the data, generating initial codes, searching for themes, reviewing themes, defining and naming themes and producing the report (Braun & Clarke, 2006). In the first step, all interviews were fully transcribed. This meant reading all the data and writing notes and initial coding of ideas. In the second step, a more systematic coding process began. The first and the second author attained consensus on the procedure of coding and coded one interview jointly. The analytic coding process was done deductively in accordance with the theoretical framework from the TPB and TTM and with the research question in mind (Appendix 2). The second author coded all other interviews. In step three, codes were compared and reviewed, dividing all relevant data into potential themes. In the following step, four themes were reviewed and checked for accuracy against the entire data set. In step five, the themes were specified. As part of step five, the first author conducted a systematic double-coding process of another interview to check for reliability and trustworthiness (Shenton, 2004). During this process, themes were discussed and

checked for accuracy. In case of differences, both analysts discussed the themes until a consensus was reached. In step six, themes were finalised and extracts and quotes were selected.

### 2.3. Trial registration

No ethical approval from The National Committee on Health Research Ethics was needed since it is a non-interventional study and no biological materials from the participants were collected. This is stated on the international homepage of The National Committee on Health Research Ethics (<http://en.nvk.dk/how-to-notify/what-to-notify>).

## 3. Results

Results are presented and explained relative to subsets of each of the theories and subsequently combined. Due to their conceptual similarities, results from PBC and SE will be presented in conjunction.

### 3.1. Respondents

The respondents were six male machine operators working both day and night shifts with a mean age of 46 years (range 32–64). They had been employed at the workplace an average of 12 years (range 3–34). In general, the respondents experienced being in good health, only complaining from having minor pain in shoulders and back. The respondents have different levels of physical activity in their spare time. Some are sedentary, but others participate in organised soccer or go to fitness clubs. They all perceive their job as a machine operator as a physically active job (Table 1).

### 3.2. Theory of planned behaviour

#### 3.2.1. Attitude

The general attitude towards the WPA programme among the respondents was very positive in terms of the company taking an initiative and trying to improve employee health, thus showing concern for their wellbeing, illustrated by the quotes below. However, the results concerning attitude showed it was of great importance to all respondents that participation was completely optional and not something they were forced or expected to do as exemplified by the respondents, “It is very positive. I think it’s very sensible. Then it’s up to you whether to accept it or not” (R2).

*...as long as it's on a voluntary basis, I think it's a good idea. Because if we need anything, we can get a little help... I haven't felt pressured into anything. I think it's fine because it's still voluntary. It's not something we have to do (R1).*

Attitude is explained by Biddle and Nigg (2000) as a function of the individual belief held about exercise as well as the evaluation, or value, of the likely outcomes of exercise (Biddle & Nigg, 2000). In relation to the respondents’ attitude, they generally expressed a positive evaluation of the possible outcome, i.e. improved physical fitness, had they chosen or felt the need to actually participate. However, in terms of beliefs regarding the behaviour itself, the majority of respondents

**Table 1. Demographic information about respondents**

Respondents						
	Respondent 1 (R1)	Respondent 2 (R2)	Respondent 3 (R3)	Respondent 4 (R4)	Respondent 5 (R5)	Respondent 6 (R6)
Gender	Male	Male	Male	Male	Male	Male
Age	64	32	48	60	39	33
Years employed	24	3	3	34	3	6
Job description	Machine operator					

considered it unlikely that they would in fact take part in the WPA as it had been presented to them. The reasons stated can be divided into two overall issues: practical concerns (time of day, distance to work) and low overall motivation, which to some extent seems influenced by a low level of fitness. The following quotes relate to the respondents' attitudes and demonstrate how behaviour, in spite of the positive evaluation, is influenced by a perceived lack of fitness, as well as a generally low motivation in terms of doing PA: "For starters, doing exercise wasn't something that really appealed to me... because ... things went quite well without it. So, it was not something I initially thought might be interesting for me to do" (R3).

*...if I'm going to start running, I'm starting from scratch, and I don't want to run around with a lot of other people and fall behind..."* (R6).

When compared with the quotes above, the following exemplifies the differences in attitude among those not taking part and the quote below shows a positive attitude regarding both behaviour and outcome.

*...I think it's great that they have started a running club and stuff like that but it's at 16:00 o'clock... ...if we work morning shifts, we can't, and if we are working nights and you have to go run first, you don't want to work for 12 hours afterwards. Anyway, I don't* (R1).

In addition, the quote exemplifies the construct of the personal ambivalence concerning WPA, by giving another common reason for the respondents to not take part in WPA, namely the time constraints presented when working 12-hour shifts from 5 a.m. until 5 p.m. or vice versa. In spite of a positive attitude towards the behaviour and a wish to participate, a single individual listed a long-lasting domestic dispute to be the decisive factor for his non-participation. So, although there were common trends within the group of respondents, reasons were very disparate in the attitudes towards behavioural constructs.

### 3.2.2. Subjective norm

The second major construct in the TPB is the respondents' subjective norm and this comprises beliefs others may have about an individual's actions and behaviour, and the extent to which this individual is motivated to comply with these expectations (Ajzen, 1991). In the present study, respondents showed no motivation to live up to ideas others may have had. This is exemplified by the following quotes:

*The decisions are made on my own. Of course, you always listen to what others have to say ... but it doesn't decide what I choose. But of course, I listen to what others say. I am not thinking so much about managers and colleagues here, more family and friends* (R2).

*Well, my department manager asked me to go out running and things like that, even though I had said no. My opinion is that he shouldn't force me to go running ... well, then I actually become stubborn* (R6).

This highlights the overall opinion among the respondents and suggests that intention and behaviour in the TPB, as explained so far, could be explained by attitudinal beliefs to some extent.

### 3.2.3. Perceived behavioural control and self-efficacy

As argued in the introduction, the TPB constructs and TTM processes have a synergistic effect and to some extent overlap when explaining the behaviour of individuals. PBC and SE constructs particularly overlap (Hagger, Biddle, & Chatzisarantis, 2002). Therefore, the following section will account for both PBC and SE.

According to the PBC construct, respondents' volitional behaviour can be predicted by the combination of factors that may increase or decrease the intent to participate (control variables), and the

respondents' power over these factors. The groups' control factors were primarily restricted by poor physical fitness and lack of time, in addition to the fact that WPA was scheduled in a fashion that limited the motivation and opportunity for participation. Although some of the respondents stated that they felt able to overcome these obstacles, in other words they had the ability to execute the behaviour and the sufficient strength of SE and power over control factors, these respondents did not feel a sufficient incentive to prioritise WPA, which in turn seems to have had a limiting effect on behaviour. As clearly seen in the following examples, when asked about participation if soccer was offered, not only the purpose but also the disciplines of running and bicycling seemed to be discouraging rather than attracting some of the respondents, thus illustrating that means of WPA also was another influential variable in relation to PBC and SE: "Let's say that the company offered... soccer!?" (I). "Then I would like to join, definitely. Because that's fun... It's a matter of what kind it is and how much of your spare time you feel like spending on it" (R5). "Well then it should be soccer or something like that. I like that and think it is fun. Then I would definitely consider it" (R3).

Further characterising the constructs of PBC and SE, another reason for non-participation was stated to be a perceived low level of ability to actually take part in WPA, due to the perception that they lacked a sufficient level of fitness which is exemplified by following quote: "...if I'm going to start running, I'm starting from scratch, and I don't want to run around with a lot of other people and fall behind. I'd rather start up by myself" (R6).

This quote underlines how the strength and magnitude of perceived level of fitness seems to influence and control the behaviour of the respondents, thus offering a further explanation as to how PBC and SE affects a sense of mastery, intent and in turn behaviour.

Summing up in terms of PBC and SE in this specific WPA behaviour, the respondents reported very poor beliefs in terms of planning and adhering to PA, disparate reasons or a poor sense of fitness.

### 3.3. *Transtheoretical model*

Accordingly, the remaining results in terms of the TTM will be presented, offering further explanation for the respondents' behaviour. Characterising individuals in the first stage of the TTM, as defined by Norcross et al. (2011), shows that there are no serious thoughts about changing behaviour (Norcross et al., 2011). Applied to the present case, four respondents consequently rejected the thought of participating in WPA and they are defined as being in the stage of precontemplation. This is illustrated by the quotes below: "Well, exercise has never really been something for me because... things went quite well... without it. So, the WPA was not something that I really thought might be interesting for me" (R6).

*...I wouldn't spend my time on it. Because if I was interested in running I would do it around where I live, instead of spending 30 minutes to get out here (worksites), run for one hour, and then spend 30 minutes getting back home* (R5).

Over the course of the 6 months between the pre-tests and post-tests, four of the respondents did not change their behaviour, and thus stayed at the stage of precontemplation. Of the remaining two respondents, one was seriously considering taking part in a given activity and therefore qualified as being in the preparation stage of the TTM. This individual was motivated to take part in WPA in order to improve physical fitness, as emphasised by the following example: "I was open to participating, to the extent it would fit into my schedule" (R2). However, in contrast to this positive statement, due to a domestic dispute, no development in stages of change in relation to behaviour was seen for the individual resulting in no progress towards change and the stage of contemplation.

This wasn't the case for the remaining respondent. Besides initial attempts to adopt a certain behaviour, small preparatory steps qualified for the stage of preparation. In contrast to the

majority in precontemplation and the one respondent in the stage of contemplation, the remaining respondent actually seemed to progress through to the preparation stage, taking some initiative towards implementing the behaviour. Progression through the stages is, among other factors, dependent on the individual's sense of control, and as such, the respondents in the present case generally reported having a good and realistic sense of control, as exemplified in the quote below, but still did not manage to progress towards the action or maintenance stage of the TTM: "...that would not be a problem... it's just to get started" (R3).

### 3.3.1. Decisional balance

In general, the respondents had no concerns about adhering to a certain behaviour once the decision had been made. However, prior to making a behavioural decision, individuals more or less consciously address their decisional balance (advantages and disadvantages for a certain behaviour) which is exemplified in the quote below (Prochaska & Marcus, 1994).

*Well the issue is to get going and to get started. If you are at home and need to leave earlier, dress for exercise and then come up here to run around with... I will not say fools (I better not) or go home afterwards to a bath and get dressed and so on, well then it is a problem. They organise it in the late afternoon when you need to go home to cook and ... (R6).*

If the disadvantages outweigh the advantages in the decisional balance, the individual can most likely be characterised as being in the earlier stages of the TTM, as argued by Prochaska and Marcus (1994), and similarly, an individual progresses through stages as the decisional balance shifts more towards advantages. As the range of quotes in this article states, the majority of respondents' decisional balance was dominated by reasons not to take part in WPA (for example, time constraints, time of day, low sense of ability to perform) as it was offered to them in the present case (Prochaska & Marcus, 1994).

### 3.3.2. Processes of change

In addition to characterising the individuals' decisional balance, the quotes also underline the respondents' processes of change, thus offering an explanation as to how they progressed through the stages of change, if at all. As presented, the majority of respondents exhibited vague signs of cognitive processes in terms of alternative ways to implement PA, which is contrasted by the one individual who progressed from the stage of preparation to the stage of maintenance. This respondent went from increasing knowledge via cognitive processes to making plans and initiating commitment and thereby utilising behavioural strategies as exemplified by following quote (Biddle & Mutrie, 2007): "...when they offered bicycle training, I had already invested in equipment for it, and wanted to give it a go" (R3).

Briefly summing up the TTM results, the advantages are clearly outweighed by the cons, cognitive processes dominate processes of change, and only one respondent exhibited progression in decisional balance, the use of more than just cognitive strategies in processes of change and the level of PBC/SE actually needed to change behaviour in the specific context of this study.

## 3.4. Summary

Combining the presented results for TPB constructs and TTM processes shows that although all respondents had a positive attitude towards outcomes of WPA, the general beliefs regarding behaviour were influenced by a lack of fitness. Furthermore, practical issues such as time of day and work organisation were great barriers to WPA. This is in accordance with the decisional balance results of the TTM, where respondents also listed obstacles to be distance to work, low overall motivation and in the case of two respondents, no objectives from tests needed to take part. These results suggest how cognitive processes instead of behavioural processes dominated the processes of change in the TTM. Furthermore, in terms of subjective norms, none of the respondents appeared to be motivated to comply with the important beliefs others may have had and respondents had a very low sense of control over factors influencing their intent. This

agrees with the combined data on SE and PBC, where half of the respondents reported that they felt able to navigate these factors but seemed to lack an incentive. Thus, only one respondent exhibited the PBC and SE necessary to potentially adhere to WPA. Further parallels can be drawn from the low degree of intent to the fact that respondents were primarily defined as being in the stage of precontemplation.

#### 4. Discussion

The aim of the study was to explore individual cognitive, behaviouristic and temporal processes and constructs causing non-adherence to WPA by answering the following research questions: 1) How do the TPB constructs influence the respondents' non-adherence to WPA, and 2) How do TTM constructs influence the respondents' non-adherence to WPA. The following discussion is divided into sections related to the TPB and TTM.

##### 4.1. *The theory of planned behaviour*

The first research question was concerned with determining which TPB constructs (attitude towards the behaviour, subjective norms and perceived behavioural control) had the largest influence on the chosen course of action. Although the respondents were generally positive towards WPA—some of the respondents had a rather negative attitude about their own participation in biking and/or running. Reasons for the latter, exemplified in the results, appeared to be a perception of poor fitness and the time of day the WPA was scheduled, which is supported by Chinn, White, Howel, Harland, and Drinkwater (2006) who found in a study of former hospitalised patients that perception of poor health, no enjoyment of PA and an adequate level of PA were primary reasons for not participating (Chinn et al., 2006). These findings are similar to those of Edmunds, Hurst, and Harvey (2013) who among other factors found lack of energy as a reason for low participation rates in WPA (Edmunds et al., 2013). Therefore, it seems reasonable to assume that these kinds of obstacles are rather common when trying to activate employees. Furthermore, the respondents to some degree address lack of physical skills and embarrassment in front of others as influencing attitude and subjective norm towards participating in WPA. This is also shown in another study by Bredahl et al. (2015) showing embarrassment in front of colleagues as a barrier to participation in WPA (Bredahl et al., 2015).

Almost as clear is the profile of another construct, PBC. A diverse range of impeding control variables are stated, such as lack of need for PA, time of day, lack of energy and domestic disputes. These reasons are in accordance with the disadvantages listed as influencing the decisional balance construct of the TTM. This is further backed up by Ajzen (1991) and Biddle and Nigg (2000), stating that successful negotiation of intended behaviour can also be influenced by external factors, such as time and opportunity, thus not necessarily being attributed to lack of intent (Biddle & Nigg, 2000; Edmunds et al., 2013). This was actually the case for the one respondent allocated to the stage of contemplation and with a positive attitude regarding participation in WPA; this individual stated that lack of participation was purely ascribed to a very low level of energy due to a long domestic dispute with his former partner. This is supported by findings of Tavares and Plotnikoff (2008), in a study of working single mothers who, similar to the references cited above, besides time constraints, stated personal and work-life balance as limitations in terms of PA (Tavares & Plotnikoff, 2008). Due to these factors beyond individual control, instead of predicting successful adaptation to the behaviour, intention could be more accurate in predicting an attempt to change behaviour, which is in accordance with the findings of Ajzen (1991) and others (Ajzen, 1991; Rhodes, Plotnikoff, & Courneya, 2008). Briefly accounting for the subjective norms (beliefs of, and motivation to comply with important others), the trend in the present case seems clear, that none of the respondents seem to be influenced directly by their surroundings. The presented TPB findings, such as negative beliefs regarding WPA, subjective norms not being an issue and poor power over obstructive factors, is in accordance with those of Hausenblas, Carron, and Mack (1997) (Hausenblas et al., 1997). In a review investigating how much the three TPB constructs each influenced intent and behaviour, they found that attitude, PBC and subjective norms, had a correlation of 1.22, 0.97 and 0.56 with intent to perform a behaviour,

respectively. Also supported by Hagger et al. (2002), this suggests that whether or not an individual adult adopts a certain behaviour is primarily influenced by the attitude towards the behaviour and to a relatively lesser extent by the degree of experienced behavioural control and to a markedly lower extent by perceived social norms (Hagger et al., 2002). Budden and Sagarin (2007) produced similar results in a study of a diverse group of working adults, holding jobs as varied as crane operator, finance manager and waitress (Budden & Sagarin, 2007). The authors concluded that attitude towards behaviour and PBC had a higher influence on PA intent than the subjective norm construct, thus supporting the findings of the present study. In addition, the results indicated that the intent to exercise was unaffected, if respondents rated attitude and subjective norms towards PA as low. This corresponds with the TPB notion that prediction on the basis of subjective norms and behavioural attitude to some extent becomes unnecessary when individuals are in complete behavioural control (Ajzen, 1991; Edmunds et al., 2013). Thus, complete individual behavioural control is very difficult to achieve in the workplace setting.

In the present qualitative study of WPA and middle-aged male machine operators, results indicate no concerns towards subjective norms and therefore when comparing this to the other TPB characteristics from this study, it seems plausible that an explanation for the low adherence to WPA could be the poor attitudinal beliefs regarding performance of the behaviour.

#### **4.2. The transtheoretical model**

Changing focus while still adding to the overall characterisation of the respondents' PBC and SE profile, the following section will discuss the SE results. As discussed above, over the course of the 6 months only one respondent displayed adequate strength of SE and behavioural control to potentially participate in the WPA. Supporting and further elaborating on this, Dishman, Vandenberg, Motl, Wilson, and DeJoy (2010), found a dose-response relationship between increases in PA and SE (Dishman et al., 2010). This may suggest that the increase in SE reported by one respondent is due to his increase in leisure time PA. As stated in the results, three respondents reported sufficient SE in terms of WPA, but two seemingly lacked an incentive to actually take part. This suggests that though reporting a strong level of SE in terms of PA, the specific WPA (bicycle or running) was deemed unrealistic, thus indicating an inadequate magnitude of SE.

Briefly summing up, respondents generally reported no development in SE over the 6-month period in relation to WPA, but one individual reported feeling some increase in SE in conjunction with adhering to leisure time PA. Both of these results are supported by the literature. Furthermore, this data suggests that, though half the respondents reported a strong level of SE in terms of PA, only one had a sufficient magnitude of SE to potentially take part in WPA. Besides accounting for SE, the second research question was to describe how TTM constructs influence the respondents' non-adherence to WPA. As stated earlier, the group tendency was primarily towards precontemplation, where individuals display no serious reflection concerning WPA as described by Norcross et al. (2011) (Norcross et al., 2011). Supporting this, Marshall and Biddle (2001), in a large meta-analysis of the application of the TTM to PA, concluded that the biggest forward shift in decisional balance occurs in the early stages of the TTM, when individuals move from precontemplation to contemplation (Marshall & Biddle, 2001). This is consistent with the present study, where results indicate that the majority of the respondents, all in the early TTM stage of precontemplation, dominantly experience disadvantages such as the time of day where the PA was scheduled and how far transportation would be per PA session, thus weighting the decisional balance towards non-participation in WPA.

From the above discussion, it is clear that several individual psychological factors influence adaptation of behaviour, but furthermore it is obvious that the practical organisation and implementation of the intervention in the workplace in terms of time schedule, organisation and culture present a great challenge and a premise for adaptation of behaviour. These results are supported by other studies showing that work organisation, work pressure, demands and support are important

prognostic factors for compliance with workplace physical exercise interventions (Andersen, 2011; Bredahl et al., 2015; Mayer, Nuzzo, & Dagenais, 2013).

#### **4.3. Critique and limitations**

The fact that progression from action to maintenance is based on time (6 months as a guide in the action stage) has been met with some critique. In opposition to this, Fink (2007) argues that processes of change (both cognitive and behavioural), self-efficacy and decisional balance to some extent predict this transition over the guideline period of 6 months (Fink, 2007). Supporting this, Biddle and Mutrie (2007) found that cognitive processes such as gathering knowledge about PA and understanding possible gains were at their highest during the action stage and the behavioural processes, such as action strategies, peaked during the maintenance stage (Biddle & Mutrie, 2007). In terms of the present case, both of these arguments (the temporal and the processual) are supported by the results for the one individual eventually reaching maintenance by test 2. Another point of critique is that interviews failed to assess the last element of SE, the generality of SE, whether a sense of mastery in one area, such as your job, can be transferred to a sense of mastery in terms of WPA. The fact that the respondents had to recall how they thought and felt more than 6 months prior to the interviews can lead to some degree of recall bias. Since the sample size was only 6 male machine operators, it is likely that the data only express a narrow range of views thus presenting a risk of key insights or perceptions being overlooked. A larger sample would have been preferable as well as representation from other job groups at the factory (such as office workers and employees not working night and day shifts). The fact that only males were included in the interviews strengthens the findings regarding men working night and day shifts in a factory, but also limits the possibility of extrapolating to women. Hence, in order to improve validity and reliability, future studies should aim to collect data during or just after respondents have made their decision and should also aim to involve a larger study sample with both men and women and all job groups being represented to encompass adequate statements. And as Nigg et al. (2011) argues in general, longitudinal studies analysing both temporal and processual factors would be prudent (Nigg et al., 2011). Moreover, a number of participants mention factors like distance from home, working hours and social factors as important. This suggests that a broad theoretical approach, such as Social Cognitive or Social Ecological theory, could be useful for understanding the full spread of potential influences across domains more broadly than the psychological constructs this study focuses upon.

#### **5. Conclusion**

In summary, the results and discussion indicate that in terms of TPB, non-participation is primarily dominated by attitudes towards the behaviour and PBC. Specifically, in spite of positive attitude towards the behaviour, the results suggest that respondents generally consider participation unlikely due to practical reasons (time of day, distance to activity, work planning) and a perceived low level of physical ability. This is emphasised by the study's PBC findings that suggest employees find the incentive to participate insufficient.

Furthermore, in terms of the TTM as presented and in accordance with the TPB findings, the majority of respondents seem to be categorised as being in the precontemplation stage and one in the contemplation stage. The results indicate that all were dominated by a very low level of cognitive processes and additionally the disadvantages of decisional balance outweighed the advantages. Disadvantages are to a large extent expressed to be time constraints, time of day in relation to work schedule and a general low level of PBC.

#### **6. Perspectives**

Based on the results of the present study, future recommendations on how to increase adherence to WPA can be made. Interventions should take participants' control over factors influencing the intervention into account and be sure that advantages of participation outweigh disadvantages. This requires individual analyses prior to initiation of an intervention. For example, analyses of decisional balance and perceived behavioural control for each individual could

be relevant. Even though it necessitates extra resources, it would most likely be worth the effort. Inspiration can also be found in the study of Marcus, Eaton, Rossi, and Harlow (1994), who found that participation could be increased by matching intervention to the specific TTM stage each individual is at (Marcus et al., 1994). This is supported by Purath, Miller, McCabe, and Wilbur (2004), who found that few, but stage-targeted counselling interventions were likely to have a positive effect on individual PA (Purath et al., 2004). Additionally, Prestwich et al. (2012) found that adherence to improved health behaviour would increase if participants had a training partner with whom the time and location PA was agreed (Prestwich et al., 2012). In the present case, one of the concerns for individuals not participating seems to be a fear of standing out and not being able to keep up with the rest of the group during training. Another major reason for not participating was stated to be practical reasons such as time of day as WPA was scheduled to take place right at the end of or just prior to the factory workers' 12 hours shifts. It seems that these issues are very important and that it would be prudent to rethink the schedule of group workouts in order to attract a larger group of participants (Bredahl et al., 2015). Moreover, grouping participants into groups or pairs of similar physical skills could be relevant to avoid the fear of standing out from the rest of the group.

### 7. What does this article add?

In summary, it is the authors' recommendation that initial analyses of participants be done and the employees included in the planning process of future WPA, both in order to increase their sense of actual influence, as well as to get more insight into the groups' actual level of fitness. When doing this, a range of issues should be taken into consideration, some of which are that some employees are already sufficiently active in their leisure time and some employees may want to take part in WPA but are deterred by the disciplines (biking and running), which is why alternatives should be considered. Thus, the authors' overall advice to the company would be to schedule, include, inform and be prepared to rethink.

Finally, this study also raises additional questions worth studying in future research. Moreover, this study applies a qualitative approach, which has not received substantial consideration within the area of WPA and therefore offers new and valuable information to existing research.

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The authors declare that we have no competing or conflicts of interest. The institutional review board of the department approved the research.

#### Author details

Thomas Viskum Gjelstrup Bredahl<sup>1</sup>  
E-mail: [tbredahl@health.sdu.dk](mailto:tbredahl@health.sdu.dk)  
ORCID ID: <http://orcid.org/0000-0002-4392-9763>  
Rasmus Soelbjerg Christensen<sup>1</sup>  
E-mail: [rasmussolbjerg@gmail.com](mailto:rasmussolbjerg@gmail.com)  
Just Bendix Justesen<sup>1</sup>  
E-mail: [jbjustesen@health.sdu.dk](mailto:jbjustesen@health.sdu.dk)  
Jeanette Refstrup Christensen<sup>1</sup>  
E-mail: [jrchristensen@health.sdu.dk](mailto:jrchristensen@health.sdu.dk)  
ORCID ID: <http://orcid.org/0000-0002-2412-5989>  
<sup>1</sup> Department of Sports Science and Clinical Biomechanics, University of Southern Denmark, Odense M, 5230, Denmark.

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## Appendix 1

### Examples from the interview guide

<p><b>General introduction</b></p>	<ul style="list-style-type: none"> <li>- Who am I?</li> <li>- What is the purpose of this study and the interviews?</li> <li>- How long is the interview going to last?</li> <li>- How will the data be used and how will it be kept safe?</li> </ul>
<p><b>Preliminary questions</b></p>	<ul style="list-style-type: none"> <li>- Age</li> <li>- How do you get back and forth to work?</li> <li>- Do you eat lunch with food from home or do you go to the cafeteria?</li> <li>- How would you describe your level of physical activity in your everyday life?</li> </ul>
<p><b>Involvement/participation</b>          TPB* - Attitude          TTM* - In which phases of the Trans theoretical Model, were the respondents between the first and second test?</p>	<ul style="list-style-type: none"> <li>- What is your general attitude towards this kind of intervention at your workplace?</li> <li>- Would you describe it as negative or positive that the company compares employee tests with their job function?</li> <li>- How do think the company managed to implement this intervention?</li> </ul>
<p><b>TPB - Past experiences, attitude</b></p>	<ul style="list-style-type: none"> <li>- Is your job physically demanding?</li> <li>- Did you do anything to prevent injury in your working day before the intervention?</li> <li>- What and how often?</li> <li>- What did you prefer to do?</li> </ul>
<p><b>TPB - Intention</b>          Which factors (attitude toward behaviour, subjective norms and perceived behavioural control) had the biggest influence on the respondents choice, in terms of participation in the physical activities at the workplace?          Which is the main explanation for the chosen course of action?</p>	<ul style="list-style-type: none"> <li>- Can you explain your initial thoughts about your participation?</li> <li>- Was it something you wanted to be a part of?</li> </ul>
<p><b>Participation in exercise</b>          TPB          Behaviour (target)          Intention          Evaluation of outcome</p>	<ul style="list-style-type: none"> <li>- To what extent did you participate in physical exercise at the workplace?</li> <li>- Could you elaborate on the purpose of your individualised exercise and diet schedule?</li> <li>- Was any biking or running a part of that plan?</li> <li>- What was your goal for the intervention?</li> <li>- Did you find the exercise and diet schedule meaningful?</li> </ul>
<p><b>How is the respondents' behaviour influenced by the perception of the beliefs of important others?</b> (regarding physical activity in the workplace)          TPB - Subjective Norms</p>	<ul style="list-style-type: none"> <li>- Can you remember situations where your decisions were influenced by other thoughts or opinions of other people or groups?</li> <li>- Please provide examples</li> </ul>

\*TPB: Theory of Planned Behavior; TTM: Trans Theoretical Model

## Appendix 2

### Examples from the predetermined categories for coding and analyses

	Level 1	Level 2	Examples of quotes from interviews	Level 3
<b>Theory of Planned Behavior</b>	<b>Behavior</b>			
	<b>Intention</b>			
	<b>Attitude</b>	<ul style="list-style-type: none"> <li>- Attitude toward behavior</li> <li>- Evaluation of outcome</li> </ul>	<p>"...as long as it's on a voluntary basis, I think it's a good idea. Because if we need anything, we can get a little help... I haven't felt pressured into anything. I think it's fine because it's still voluntary. It's not something we have to do. (R1)."</p>	
	<b>Subjective norms</b>	<ul style="list-style-type: none"> <li>- Beliefs that important others have</li> <li>- Motivation to comply with important others</li> </ul>	<p>"The decisions are made on my own. Of course, you always listen to what others have to say ... but it doesn't decide what I choose. But of course, I listen to what others say. I am not thinking so much about managers and colleagues here, more family and friends (R2)."</p>	
	<b>Perceived Behavioral Control</b>	<ul style="list-style-type: none"> <li>- Control variables – perceived presence of factors facilitating or impeding performance</li> <li>- Power over control factors – perceived impact facilitative or inhibiting factors may have on performance</li> </ul>	<p>"..if I'm starting jogging, then I'm starting from zero. I don't want to be last around a lot of other people. I'd rather start up by myself" (R6)."</p>	<ul style="list-style-type: none"> <li>- Past experiences</li> <li>- Confidence in judgment of own control</li> <li>- Actual Control</li> <li>- Change in intention</li> <li>- Sense of power over control factors</li> </ul>
<b>Trans Theoretical Model</b>	<ul style="list-style-type: none"> <li><b>Precontemplation</b></li> <li><b>Contemplation</b></li> <li><b>Preparation</b></li> <li><b>Action</b></li> <li><b>Maintenance</b></li> </ul>		<p>"Well, exercise has never really been something for me because... things went quite well... without it. So, the WPA was not something that I really thought might be interesting for me (R6)."</p>	
	<b>Self efficacy</b>	<ul style="list-style-type: none"> <li>- Self insight</li> </ul>		



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